# Project MESA

## Broadband Mobility for Emergency and Safety Applications

## 2004 Wireless Broadband Forum

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David Thompson, TIA

+1.703.907.7749

dthompson@tiaonline.org

# Presentation Outline

- **The Challenge**
- **What is Project MESA?**
- **MESA Participants**
- **MESA SoR**
- **MESA TSG SYS**
- **Some Key MESA Capabilities and Requirements**
- **"The Scenario" - Practical Applications**
- **Achievements**
- **Moving Forward**

- **Note that Public Protection and Disaster Relief (PPDR) is an international term that for this presentation includes the terms Public Safety, Disaster Response, Emergency Communications, others.**
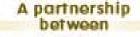
# The Challenge

- **Public Protection and Disaster Relief (PPDR) organizations and agencies responding to incidents can encounter incompatible communications systems or lack of available/usable infrastructure.**

- **PPDR activities and responses can be disadvantaged by the current inability to quickly access and communicate simultaneous (*as required*) voice, data, imaging, live video, biotelemetry, etc.**

- **Experience from wide-scale emergencies and input from PPDR professionals/agencies have made it clear there is a next-generation need for broadband, interoperable, effective, high-quality, secure, agile (spectrum and equipment), and reliable communications systems and capabilities.**

  – Implementation provides life-saving benefits for PPDR professionals and the ones they serve.

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# What is Project MESA?

- **Project MESA - a collaborative effort for next-generation mobile broadband for PPDR activities/market.**
  - Cooperative standards partnership between TIA and ETSI brings together PPDR agencies, equipment users, industry/standards bodies and researchers.
  - PPDR professionals/users (Gov't/Quasi-Gov't) and applications may include:
    - *Law enforcement, fire fighting, homeland security, emergency management, national and international crime and terror investigations, emergency and medical services (Telemedicine), disaster and humanitarian response, peace-keeping forces, natural resource applications, airport or facility security and special surveillance, sensing and robotics, others.*
    - *Potential for commercial broadband filter-down applications.*

# What is Project MESA?

- **In January 2001, ETSI (Region #1) and TIA (Region #2), as the initial/current Organizational Partners (OPs), finalized an international standardization project in Mesa, AZ (USA).**
  - Project's name given in recognition of the signature city
  - Acronym also serves as an accurate description:
    MESA = **M**obility for **E**mergency and **S**afety **A**pplications.
- **Development of globally applicable suite of mobile broadband capabilities and specifications.**
  - Resulting MESA technical specifications driven by coordinated user requirements and scenarios.
    - Including coordinated liaisons with relevant external entities.
  - PPDR system owner benefits:
    - Increased economies of scale/procurement availability.
    - Lowered development/manufacturing costs.
    - Promotes technical consistency and interoperability.

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# What is Project MESA?

- **MESA specification development work also focuses on maintaining the integrity and security of a national network**.
  - Provides flexible capabilities for needed **inter-agency/cross-border interoperability**, and
  - Coordination of regional/international responses to emergencies and other relevant applications.
- **The MESA technical output will be based on international user and industry (including research entities) input.**
- **Will enable the harmonized identification and development of terrestrial broadband technology and data transmission service capabilities and specifications, for critical PPDR services.**
  - Technical work driven by common requirements, scenarios and required/identified spectrum allocations.

# MESA Participants

- **Reps from 70+ agencies/organizations (15+ countries).**

  - Majority of PPDR organizations and professionals currently from North America and Europe.

  - Research organizations.

  - Communications industry (including support from recognized SDOs).

  - Observers:
    - Telecommunications Technology Association (TTA), Korea
    - Telecommunications Standards Advisory Council of Canada (TSACC)
  - Full affiliation list: http://www.projectmesa.org/info/MESApeople.htm

- **Recognized within entities like the DHS, N. American Governmental entities, UN (ITU, Humanitarian Relief Section), NATO, EU Commission, National/International PPDR Communication's User organizations, others.**
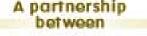
# MESA SoR

- **Initial MESA Statement of Requirements (SoR) approved in 2002.**

- **Developed within the user-focused Service Specification Group (SSG) of MESA and approved by the Project MESA Steering Committee (SC) in 2002.**

- **Represents consolidated multi-national vision expressed by critical public service users of communications equipment and systems.**

  - Intended to describe and define functional user requirements, capabilities, applications and scenarios that involve broadband air interface data rates.

- **SoR is a living document; updated at regular intervals.**

  - Requirements, services and scenarios continue to be updated in revisions of the MESA SoR document.
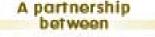
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# MESA SoR

- **Related documents (approved by MESA SSG and SC).**
  - **SoR Matrix**: Mapping document that defines initial requirements to be used as a basis for the elaboration of the MESA SoR into the Technical Specification Group (TSG).

  - **Definitions, Abbreviations and Symbols Document**: Will be used in documents prepared by Project MESA (*provides common, cross-regional understanding*).
    - Matrix may also be a useful SoR/User mapping tool for other interested parties.

# MESA SoR

- **Emphasis placed on applications identified by users/agencies as key requirements, but which current applied technology may not fully deliver.**

- **To view the latest SoR document, please go to http://www.projectmesa.org/ftp/Specifications/**

  - **Continued contribution is encouraged.**

- **MESA industry-led technical group (TSG SYS) will utilize current and future user-defined SoR revisions as a blueprint for "Systems of Systems" PPDR communications capabilities.**

  - **NGN Communications for PPDR**

# MESA TSG SYS

- **Based on the SoR, the MESA Technical Specification Group System (TSG SYS) is now actively working on the corresponding technical specifications.**
  - Output will be submitted to supporting standards bodies (*i.e.*, TIA, ETSI, the Organizational Partners) for regional development and publication.
- **Technical specification documents will define an open-systems architecture for interoperability.**
- **Specifications and final standards will need to meet rigorous requirements of PPDR users.**
  - Including the ability to ensure dynamic bandwidth, bandwidth on demand, priority levels of service, very consistent and reliable equipment, service and connectivity in harsh/extreme environmental conditions.

# MESA TSG SYS

- **"System of Systems" approach:**

  - Building blocks that utilize existing Broadband communications technologies and existing infrastructures, where appropriate, and available to enable needed communications.
    - No duplication of effort, use what works/available.
      - Leverages existing technology and available services, as appropriate.
    - Facilitate standardization for identified gaps involving new or Next-Generation communications capabilities.
      - May include a variety of advanced R&D.
    - Project MESA expected to coordinate with appropriate technical development groups and fora.

# Some Key MESA Capabilities and Requirements

- **A MESA capable system would combine mobility and rapid deployment with needed broadband data rates and two way communications.**

- **The Project MESA SSG, TSG SYS and SC are committed to creating a suite of specifications and eventual standards that will ensure the PPDR community is able to have immediate high-speed data access using a multitude of technologies, applications and services.**

  - Focus has been to create a process and then specifications for wireless broadband communication links that could be used within an established network or on a hot-spot (ad-hoc) basis, as systems may require.

- **Complements and meant to interwork with known or planned narrow to broadband wireless standards, projects and technology (*i.e.*, 2-3G, 802.11) and infrastructures.**

# Some Key MESA Capabilities and Requirements

- **Projected that future MESA-capable systems (*i.e.*, ad-hoc/fixed networks) will have full capability to interface at a number of levels to both public and private networks and carriers.**
  - Including capabilities for priority treatment of PPDR communications in public networks (*i.e*., prioritization service).
- **MESA capabilities may integrate with public and/or private networks and services, as required, to provide appropriate accessibility (Diverse accessibility to data and com links)**
  - Authorized users may require utilization of available public/private wireless accessibility points, use of public wireless infrastructure, existing private/dedicated radio services, satellite communication links, new technologies and ad-hoc capabilities, etc.

# Some Key MESA Capabilities and Requirements

- **MESA capabilities may be complementary to and interoperate with public infrastructure components and existing services.**

- **Locally/nationally/regionally deployable.**
  - Inter-agency and international coordination flexibility
  - Equipment and spectrum interoperability and flexibility.

- **Self-sufficient system elements (independent from availability of public networks, public radio frequency spectrum and supply of electrical power), as required.**
  - *i.e.*, ad-hoc mobile equipment.

# Some Key MESA Capabilities and Requirements

- **Auto-establishing /self-healing/re-establishing wireless ad-hoc network elements.**

- **Capabilities to intercommunicate with identified and standardized land mobile radio (LMR) platforms.**

- **MESA capabilities allow PPDR professionals to communicate over a wide area, using a myriad of technological platforms and applications.**

  - MESA capabilities or related technology may or may not cover a user's entire geographical area of responsibility.

    - Function (depending on the scenario) could be to provide **localized** or **"hot spot"** services or to support an underlying level of broadband system services.

      - Even when a specific emergency is not currently underway.

# Some Key MESA Capabilities and Requirements

- Multiple levels of security and encryption
- Multiple users with multiple applications
- Secure and interoperable capabilities and communication over a wide area or defined hot-spot
- Flexibility involving existing infrastructure dependence
- Multiple input / output platforms and applications
- Transportable nodes
- Self-establishing and healing network nodes

- Dynamic or adaptive bandwidth and equipment capabilities
- High-speed data
- Analog/digital voice, video and sensing
- Still photos, complex graphics and drawings files
- Enhanced patient and response worker bio-telemetry info
- Robust management and control systems

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# "The Scenario"

- **Consider a major disaster involving …**
- **Fire trucks, ambulances, police vehicles and surveillance helicopters which are en route to the scene …**
- **Electrical power is shut off in the area and worried citizens overload cell and wired phone systems…**
- **Response can involve utilization of fixed and/or ad-hoc MESA-capable elements**

# Mobile Ad-Hoc Network
*" The Moving Hot-Spot"*

- Fast, deployable, compatible

- Auto-establishes network

- Recognize terminals

Airborne Control

Backhaul Satcom Link

The MESA Firefighter

Telemedical Assistance

*Example of full on-site Command Control and Communication*

Respiratory rate

Blood Pressure

Dual Axes Accelerometers

Heart rate

Geiger Counter

Pulse Oximeter

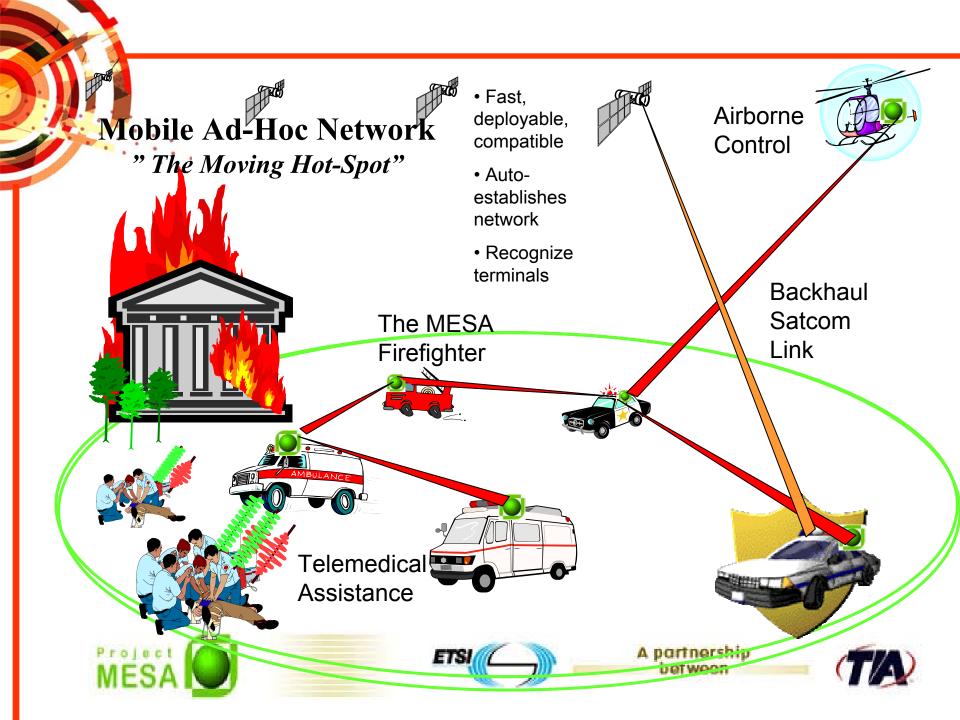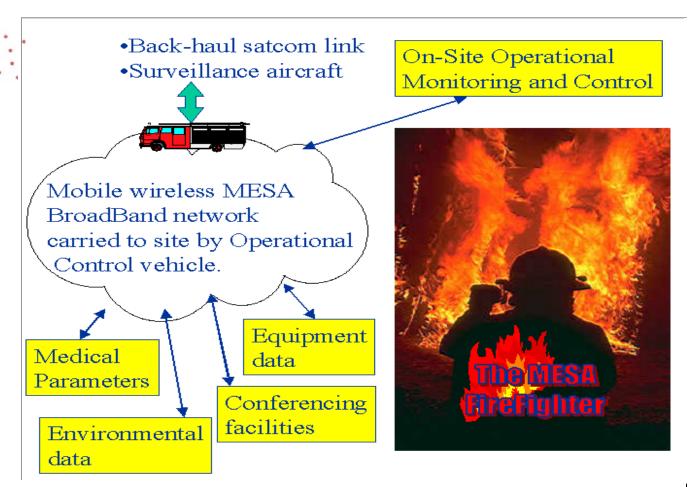Suit and body surface Tempurature

**The MESA FireFighter**

*Illustration of a MESA-capable Firefighter*

• Full Command Control and Communication (C3) to Firefighters

• Online, real-time broadband interlinking

• Infra-red as well as visible light video monitoring
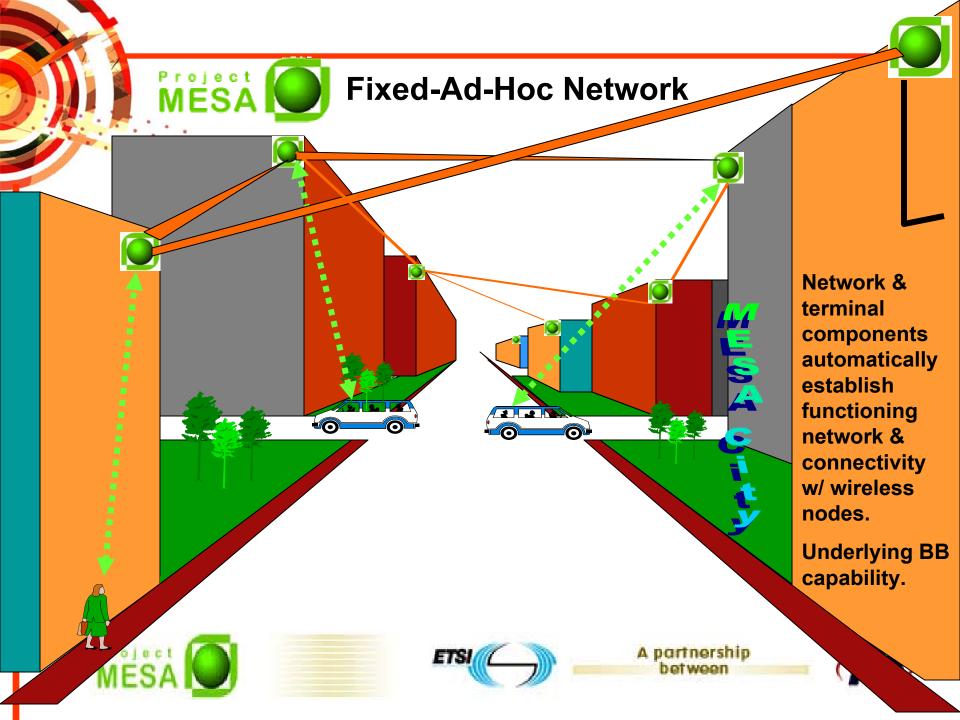
• Vital parameters surveillance

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# Fixed-Ad-Hoc Network

Network & terminal components automatically establish functioning network & connectivity w/ wireless nodes.

Underlying BB capability.

# Emergency and Medical Services (EMS)
## *Remote Patient Monitoring*

**Frontline Medical Assistance
by Broadband Wireless Networking:**

Video on-line
Electro Encephalographic data (EEG)
Electro Cardiograph (ECG)
Blood Pressure
Temperature, etc.

The bottom line…

**Bit-rates can save lives**
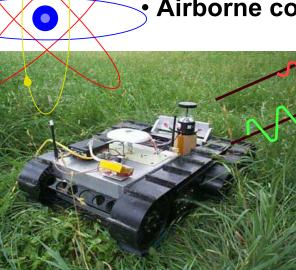
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# Mobile Robotics

- **Automated inspection of non-accessible or hazardous areas**
- **Rescue of people from hazardous areas**
- **Anti-terrorist actions**
- **Incident response both tactical and non-tactical**
  - **Urban warfare**
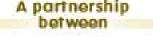  - **Haz-Mat Handling**
  - **Airborne control**

# Achievements So Far

- **Government and industry awareness established in the European Union and North America; increasing in other regions.**
  - TIA and ETSI working to raise awareness levels (regionally/globally) for the critical needs of PPDR users

- **PPDR User support from 70+ organizations/agencies from all 3 Regions**

- **Current SoR and related documents have been developed and are available/being utilized**
  - *Project MESA Definitions, Symbols, and Abbreviations*; the *Project MESA SoR Matrix*

- **Work on corresponding technical specifications underway in MESA TSG SYS**
  - Aggressive development plan and time-line for initial drafts

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# Achievements So Far

- **Recent Global Standards Collaboration-9 recognized Project MESA in a Resolution identifying PPDR as a High Interest Subject.**

- **MESA OP/members involved with ITU-T Telecommunication for Disaster Relief coordination and standardization activities.**

- **Project MESA broadband standardization activity documented in ITU-R Report M.2033.**

# Achievements So Far

- **ITU-R WRC-2003 approved a new resolution that supports radiocommunication/new technologies for PPDR applications.**
  - Encourages Member participation in ongoing technical studies for implementing harmonized PPDR specifications.
    - Project MESA, and its OPs, were specifically mentioned for ongoing Broadband PPDR standardization activities.
  - Urges governments to use regionally harmonized bands for PPDR, to the maximum extent possible.
  - Lists specific regional frequency bands/ranges that governments may consider when undertaking their national planning for PPDR.
  - Manufacturers are also encouraged to take this Resolution into account in future equipment designs.
  - Encourages removal of administrative barriers to cross-border movement of disaster communications equipment.

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# Moving Forward

- **MESA participants will utilize "System of Systems" capabilities and specifications approach.**
  - Leverage existing or near-term technologies/services that are capable of providing needed bandwidth services for Next-Generation PPDR communication and accessibility (secure/varied connectivity).
  - Develop new technologies/services where none currently exists.
- **Encourage participation in, or communication with, Project MESA (via OPs TIA and ETSI) by affected agencies and administrations, standards groups, equipment providers, service providers, research organizations, etc.**
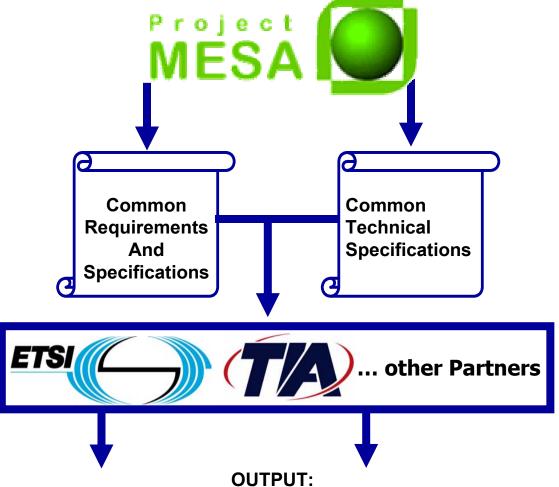
# Moving Forward

- **All affiliates of the OPs, including industry and PPDR agencies/entities, can participate in the work of Project MESA.**
  - The Partnership Project is open to new OPs and members on a global scale.
- **MESA deliverables will continue to be developed and transposed, as necessary, into regional standards involving next-generation mobile broadband technology for PPDR, security and emergency response professionals.**
  - Coordinated communication and contribution between other standards bodies, user entities, etc.

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# Project MESA

**Common Requirements And Specifications**

**Common Technical Specifications**

**ETSI** · **TIA** ... other Partners

**OUTPUT:**

Harmonized/coordinated regional specifications, for Broadband Terrestrial Mobility and SatCom applications and services, driven by common scenarios, requirements and spectrum allocations.

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# For More Information

- **Participation by interested administrations, users, and organizations is welcomed and encouraged**
  - Particularly PPDR user requirements and technical contribution from outside of N. American and EU regions.
- **To join Project MESA, visit: http://www.projectmesa.org/IE/gen_info/join.htm**
  - Public Safety (PS) member, Individual Member (IM), Observer, Guest, Organizational Partner (OP)-*Standards bodies*
- **Please refer to the www.projectmesa.org website for further information.**
  - Downloadable TIA MESA brochure: http://www.tiaonline.org/standards/mesa/MESABrochure_TIA_Final.pdf
  - ETSI version—contact below
- **Email: mesa@projectmesa.org**

## Project MESA Meetings:

- March, 2004 in Boulder, CO (USA)
- Fall, 2004 in EU

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# The End

# *Thank you for your time!*